



**Trends in Blood Mercury Concentrations  
and Fish Consumption  
Among U.S. Women of Childbearing Age  
NHANES, 1999-2010**

Final Report  
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Summary of Report Findings by:  
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# Why was it done?

- Support the idea that exposure to MeHg is almost exclusively through fish consumption
- Determine the trends over time for the relationship between fish consumption and blood MeHg levels among women of childbearing age

# How was it done?

- EPA looked at data from 1999-2010 from the Centers for Disease Control and Prevention (CDC) National Health and Nutrition Examination Survey (NHANES)
- EPA developed a methodology to assess trends over time in the NHANES blood mercury data

# How was it done? (cont.)

- EPA looked at NHANES 24-hour dietary recall data that tracks how many times in the past 30 days respondents consumed 31 varieties of finfish and shellfish
- EPA combined these data to create an estimate of 30-day finfish/ shellfish consumption in grams, and grams per kilogram bodyweight, for each respondent.

# How was it done? (cont.)

- EPA gathered data on fish tissue mercury concentrations from 20 sources, including the U.S. Food and Drug Administration, State Departments of Environmental Quality and Health, and data presented in peer-reviewed journals.
- EPA used this data, combined with the dietary recall data to estimate 30-day mercury intake in micrograms per kilogram bodyweight and the mercury concentration in the fish consumed.

# How was it done? (cont.)

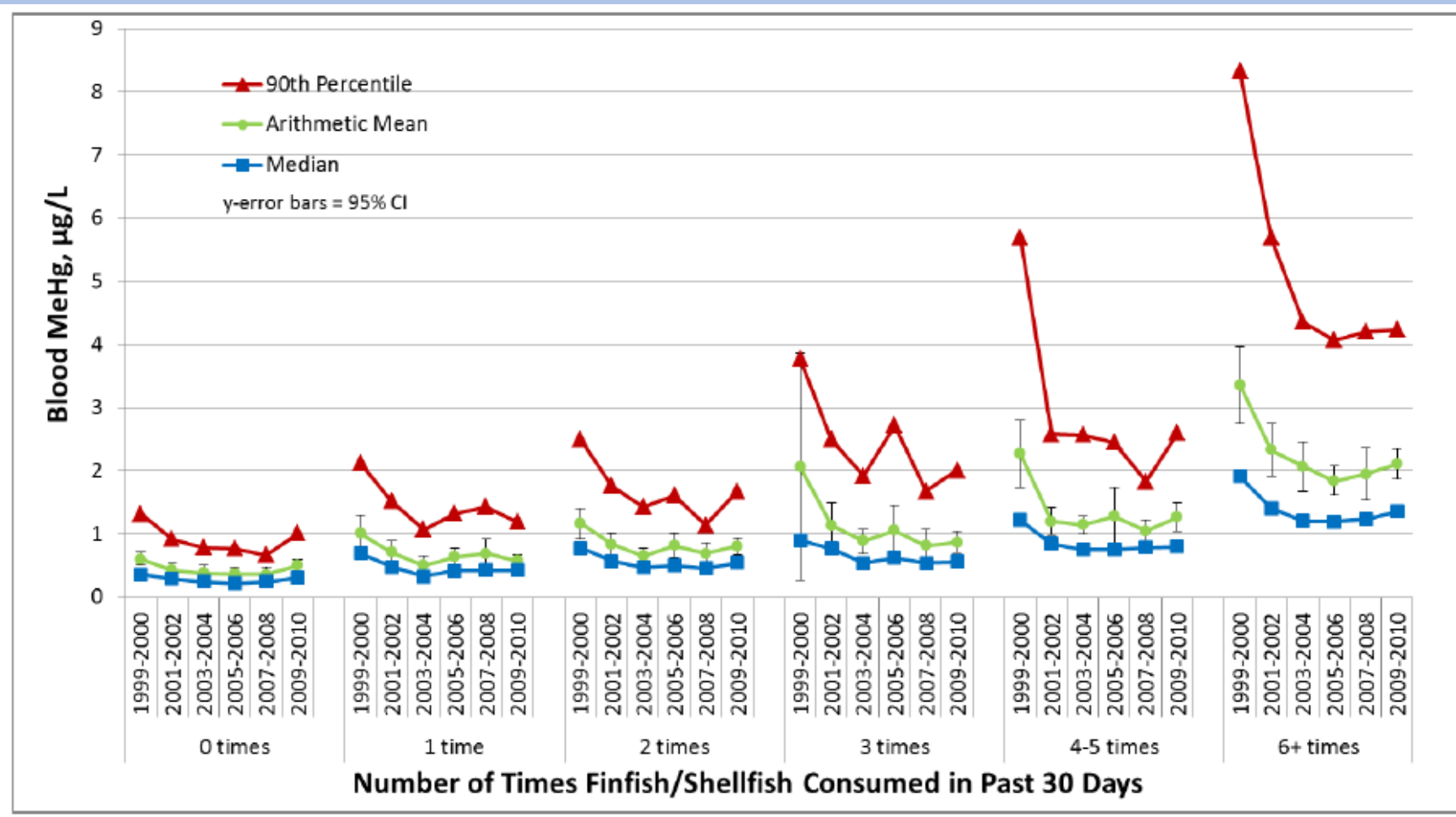
- EPA modeled the relationship between mean blood MeHg, blood MeHg above 5.8  $\mu\text{g/L}$ , and fish consumption and mercury intake variables using regression analyses, adjusting for differences by respondent age, race, income, and time across NHANES data releases (1999-2010).

# What did they find?

- For blood MeHg, the geometric mean in 1999-2000 was 1.51 times higher than the geometric mean across the subsequent 10 years. This represents a decrease of 34 percent between 1999-2000 and 2001-2010.
- The percent of women of childbearing age with blood MeHg over 5.8ug/L in 1999-2000 was 2.86 times higher than the percent of women in 2001-2010, representing a 65 percent decrease between 1999-2000 and 2001-2010.

# Trends in Blood MeHg

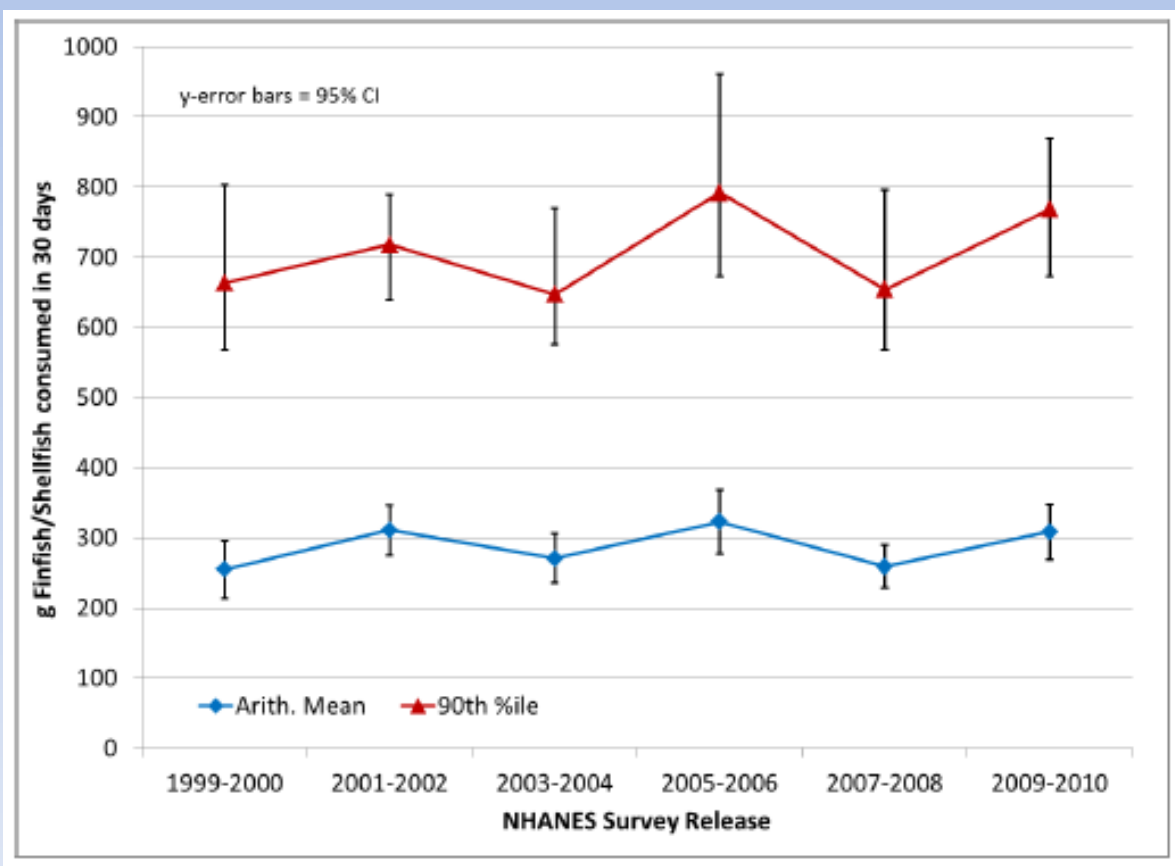
Mean blood MeHg concentrations by reported frequency of fish consumption in 30 days, women aged 16-49 years, NHANES 1999-2010 (with 95% confidence intervals, median, and 90<sup>th</sup> percentile)





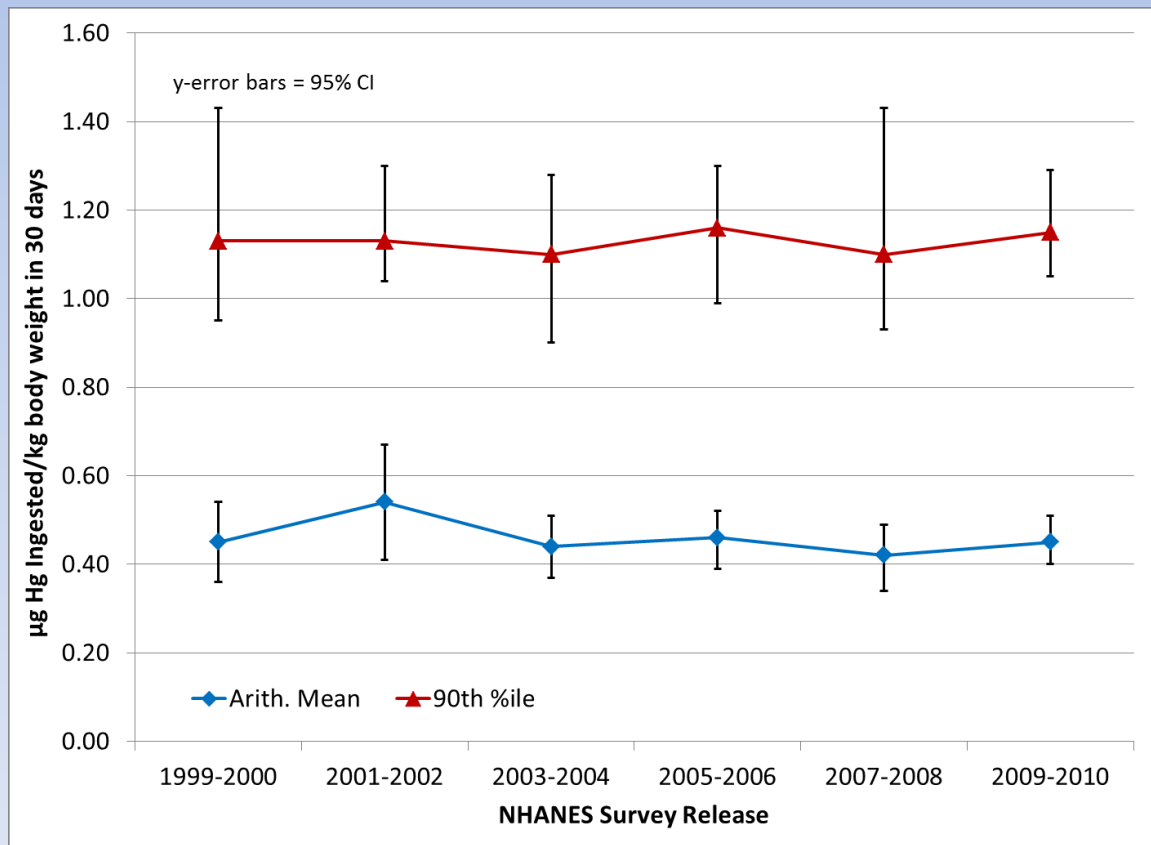
# Less Fish Consumed?

Estimated mean and 90th percentile amounts of fish consumed in 30 days, women aged 16-49 years, NHANES 1999-2010 (with 95% confidence intervals)



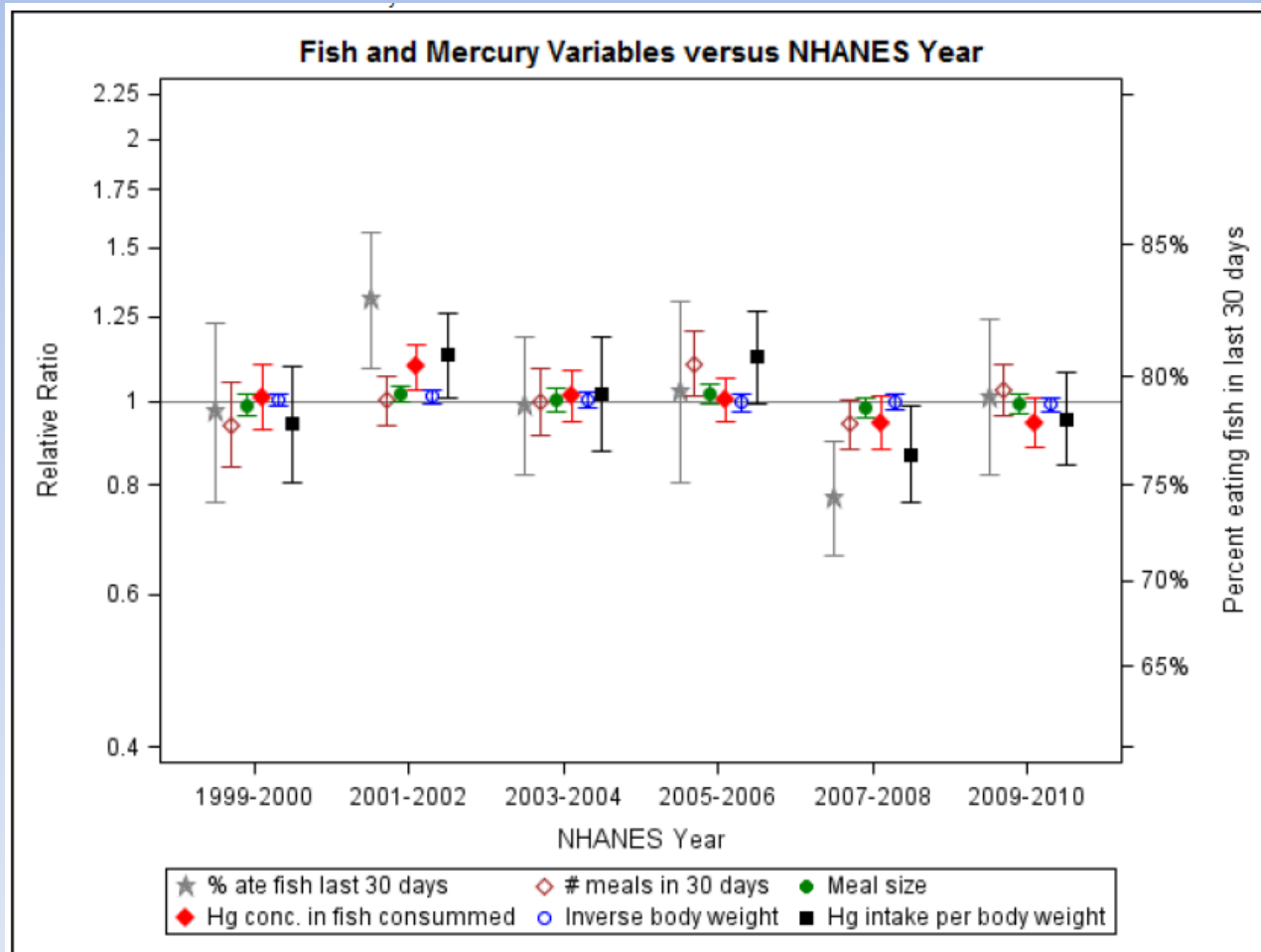
# Less Mercury in Fish?\*

Estimated mean and 90th percentile amounts of mercury ingested, normed to body weight ( $\mu\text{g}/\text{kg}$ ) in 30 days, women aged 16-49 years, NHANES 1999-2010 (with 95% confidence intervals)



# Better Choices Made?

Relative ratios and 95% confidence limits from the models predicting fish consumption and mercury intake variables versus NHANES survey release



# Findings Summary

- Significant relationship between mercury intake from fish consumption and blood mercury.
- Little change in fish consumption and mercury intake over the study period.
- Higher blood MeHg concentrations observed with increasing age and income
- A “marginally statistically significant decreasing trend” across NHANES survey releases in the ratio of mercury intake to fish consumed. \*

# EPA's Conclusion

- The “marginally statistically significant decreasing trend” across NHANES survey releases in the ratio of mercury intake to fish consumed indicates that women may be shifting their consumption to fish with lower mercury concentrations.
- Other studies are needed to determine
  - 1) if there is a link between changing consumption patterns and blood mercury
  - 2) if fish advisories have led to the changing consumption patterns.
- Full Report at <http://www.epa.gov/hg/advisories.htm>

# Take Home

- Fish consumption has verified health benefits (great protein source, low saturated fat, high in Omega-3 fatty acids)
- Following the recommendations of posted fish advisories helps protect your health and your family's health.

# Weakness of the Study

- “Static” fish tissue MeHg data from 1997-2010.
- Could fish tissue MeHg levels be dropping , resulting in the findings?

| Species                  | Hg concentration<br>( $\mu\text{g Hg/g wet weight}$ ) |
|--------------------------|---|
| Bass                     | 0.263   |
| Breaded fish products    | 0.013   |
| Catfish                  | 0.107   |
| Cod                      | 0.089   |
| Flatfish                 | 0.054   |
| Haddock                  | 0.069   |
| Mackerel                 | 0.639   |
| Perch                    | 0.143   |
| Pike                     | 0.301   |
| Pollock                  | 0.013   |
| Porgy                    | 0.315   |
| Salmon                   | 0.041   |
| Sardine                  | 0.023   |
| Sea bass                 | 0.188   |
| Shark                    | 0.628   |
| Swordfish                | 1.265   |
| Trout                    | 0.045   |
| Tuna                     | 0.242   |
| Walleye                  | 0.265   |
| Other finfish            | 0.097   |
| Finfish, not specified   | 0.139   |
| Clam                     | 0.026   |
| Crab                     | 0.057   |
| Crayfish                 | 0.028   |
| Lobster                  | 0.190   |
| Mussel                   | 0.026   |
| Oyster                   | 0.027   |
| Scallop                  | 0.017   |
| Shrimp                   | 0.014   |
| Other shellfish          | 0.032   |
| Shellfish, not specified | 0.026   |

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